An Examination of the Effects of the Disposition of Acquired Property By Financial Institutions on the Kansas Farmland Market

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during the first quarter of 1987. Comparing this to the Great Depression era, the 1938 Report of the Chief of the Bureau of Agricultural Economics reported approximately 28 million acres of farmland were held by financial institutions as of January 1, 1937. However, the acquisitions during the 1980s occurred much more rapidly than the acquisitions of the 1930s. Land acquired by institutional lenders in the Wichita district of Farm Credit Services (of which Kansas is a part) during 1985 and 1986 was 1.25 million acres which was 26% of the estimated annual farmland sales for this district for the year. This figure was 24% for the nation.

Stam, Gajewski, and Koenig suggest that lender holdings of farmland are a factor in the farmland market when the nation as a whole is considered. They argue that these holdings are not a dominating factor, though, due to a number of reasons. They state that the lenders will not likely sell all of their holdings in any single year. The ratio of acquired property holdings to expected annual transfers therefore overstates their likely importance at any time (Stam, Gajewski, and Koenig). This paper examines characteristics of land acquired by financial institutions and the disposition of land acquired.

Hedonic Pricing Theory

One of the major objectives this study addresses is to determine whether the price of land sold by financial institutions received a similar price as land sold by private institutions. The sale of a parcel of farmland is influenced by many quality factors. When comparing the price of land sold by a financial institution and the price of land sold by an individual, it is important to adjust for quality differences, if these differences exist by seller. The hedonic approach to market analysis will allow these quality differences to be accounted for.

The economic definition of a hedonic price is the marginal cost that an individual is willing to pay to obtain a desired characteristic. The process of estimating hedonic prices for quality differences can be traced back to the early work of Waugh. Ladd and Martin were the first to look at the impact of production input characteristics on the demand for inputs. Ladd and Martin assert that inputs such as land as useful in the production process because of the characteristics of that input. The price of the input is thus the sum of the

This study will use the following hedonic pricing model to examine whether the type of seller affects the price of land. The pricing model estimated in this for this study is:

$$\begin{aligned}(1)\ \text{Land} = {} & a_0 + a_1Q_1 + a_2Q_2 + a_3R_1 + a_4R_2 + a_5\text{Crop} + a_6\text{Con} + a_7\text{Imp} \\ & + a_8\text{Min} + a_9\text{Irr} + a_{10}\text{Acres} + a_{11}\text{West} + a_{12}\text{East} + a_{13}\text{Jan} + a_{14}\text{Feb} \\ & + a_{15}\text{Mar} + a_{16}\text{May} + a_{17}\text{Jun} + a_{18}\text{Jul} + a_{19}\text{Aug} + a_{20}\text{Sep} + a_{21}\text{Oct} \\ & + a_{22}\text{Nov} + a_{23}\text{Dec} + a_{24}\text{Yr88} + a_{25}\text{Yr87} + a_{26}\text{Yr86} + a_{27}\text{Yr85} \\ & + a_{28}\text{Yr84} + a_{29}\text{Yr83} + a_{30}\text{Yr82} + a_{31}\text{Yr81} + a_{32}\text{Yr80} + a_{33}\text{Yr79} \\ & + a_{34}\text{Yr78} + a_{35}\text{Yr77} + a_{36}\text{Seller}\end{aligned}$$

where Land is the per acre price for a tract of land, Q_1 is a binary variable representing high quality land, Q_2 is a binary variable representing low quality land, (average quality land is the default), R_1 is a binary variable representing paved road access, R_2 is a binary variable representing dirt road access, (gravel is the default), Crop is the percentage of land which is crop land, Con is a binary variable which is one if the land was sold on contract, Imp is a binary variable which is one if the land contains improvements, Min is a binary variable which is one if mineral rights were included in the sale, Irr is a binary variable which is one if the tract was irrigated, and Acres is a variable measuring the size of the parcel in acres. West and East are binary variables for the region of the state the sale was located. Central is the default variable in this equation. The month variables are binary variables representing the month of the sale. These variables were included to correct for seasonality in land sales if any existed. These variables are interpreted as the difference from land sold during the month of April. The year variables were included to account for general changes in land price. The base year was 1989. Seller was included as a binary variable representing whether or not the seller of the land was an individual or a financial institution such as a bank, the Farm Credit System, or Farmer's Home Administration.

Data

The data for this study was collected by the Kansas Society of Farm Managers and Rural Appraisers for the purpose of assisting their members in appraising agricultural real estate. This study covered the thirteen year period beginning in January, 1977, and ending in December, 1989. The total number of usable sales for this study was 12,007 sales representing 2,392,300 acres. The low number of sales for the individual years was 701 in 1985 and the high was 1,260 sales in 1987. The total number of sales reported for this period was 17,465 sales. Roughly 5,500 sales were unusable for this study because the parcel was small (some sales included a house and only five acres) or because incomplete data was reported on the transaction. After these deletions were made, 69% of the original sales were used for the study. Data reported included land quality, road access, amount of cropland, whether or not the sale was financed with a land contract, improvements, mineral rights, irrigation, size of the parcel, location in the state, and type of seller.

Figure 1 illustrates the number of total sales of Kansas land between 1977 and 1989 and the number of sales by financial institutions. Approximately 94% of all land sales by institutions occurred between 1985 and 1989. However, only 41% of the total transactions took place during these five years. In 1987 alone, sales by financial institutions represented 37.4% of the total sales for that year.

Quality Factors of Sales by Financial Institutions and Individuals

Since the majority of the sales by financial institutions occurred between 1985 and 1989, differences in quality characteristics of the parcels by seller are compared. Examining the differences in the characteristics may reveal some of the factors leading to financial stress in the 1980's. If quality differences occurred between sales made by private individuals and sales made by financial institutions, one can hypothesize that these characteristics may reveal something about the cause of financial stress.

Table 1 compares the sales between financial institutions and individuals from 1985 through 1989. Financial institution related sales were found to have fewer parcels which were classified as good quality, more parcels which were average quality, and slightly more low quality sales. In addition, the percentage of the parcel which was cropland was found to be lower for institution sales. It can be concluded that land sold by these institutions was typically lower quality land than land sold by other individuals. The results would suggest that farmers with a higher proportion of marginal land had a harder time being successful financially.

Sales made by financial institutions had a higher percentage of transactions sold on contract. This may partly be explained by the fact that a financial institution can be more successful in selling the parcel quickly if it is willing to set up the land purchase as a loan to the new buyer. In other words, a contract is drawn up spreading out payments which are to be made at dates in the future and the institution agrees to carry the settlement price as a note on their books until payment in full is received. A slightly higher percentage of sales by institutions contained improvements for 1985-89. However, it was found that there was essentially no difference between the percentage of sales for the two categories over the entire study.

Sales by institutions conveyed mineral rights to the buyer on a larger percentage of the sales. When a borrower signs a mortgage, the financial institution typically incorporates wording which places a lien on mineral rights also. Since the institution would not have a way to easily manage mineral rights and any applicable royalties it retained, it is easiest for the institution to simply convey these mineral rights to the new buyer and incorporate the value of these rights into the sale price.

Institution sales had irrigated acreage present on a larger percentage of the transactions than did private sales. Irrigated agriculture requires more investment than dryland farming because capital outlay per acre and fuel and fertilizer expense are among the costs which are higher. Because of the more stable yields that are generated, business risk is likely lower. Using the Gabriel and Baker risk balancing argument, this suggests that more financial

leverage would be used on this type of farm. Thus, these farms were likely more susceptible to the adverse occurrences during the 1980's.

The location of the parcel was a factor which was different depending on whether the seller was private or a financial institution. The state of Kansas was divided roughly into thirds with the eastern third of the state being primarily western Corn Belt agriculture with corn and soybeans as the dominate crops. The central third is mainly dryland wheat and milo agriculture. The western third of the state is irrigated corn and soybeans or summer fallow wheat and milo. The eastern region had a substantially higher percentage of financial institution sales and the central region had a notably lower percentage of institution-related sales. The western region did not produce a substantial difference. These results indicate that more sales precipitated by financial duress occurred in the eastern region of the state than was proportionally anticipated. The central region had a smaller portion of the financially stressed sales than expected. Annual average net farm incomes of Kansas farms participating in the Kansas Farm Management Association were lower for eastern Kansas relative to central Kansas each year between 1982 and 1985. These lower incomes would have a delayed impact on farmland repossessions and subsequent sales by institutions.

The average size of the parcel sold was essentially the same. The mean acreage was 214 acres for financial institutions and 207 acres for individuals. The standard deviation was 212 acres for the institutions and 284 acres for individuals.

Quality Factors of Sales among Categories of Financial Institutions

It is also beneficial to look at a breakdown of the financial institution sales by lender category to determine if any differences between lenders were present. Table 2 shows the percentage of total sales by institution according to the year in which the sale occurred. The sales are shown for the Farm Credit System (FCS), commercial banks (banks), and the Farmers Home Administration (FmHA). The pattern of sales for these institutions reflects very few farmland sales caused by financial duress prior to 1983. The years 1983 and 1984 saw increases in sales by all three categories of institutions. FCS and bank sales increased up through the peak in 1987 and declined in both 1988 and again in 1989. FmHA sales were proportionally lower in 1985 and 1986 than the other institutions. This can likely be attributed to the court-imposed moratorium on collateral acquisition during this period. FmHA sales also peaked in 1987 and both 1988 and 1989 had substantially fewer sales than the peak.

Table 3 summarizes the quality factors of the parcels acquired by these institutions. Land quality for FmHA parcels is generally lower than for the other institutions. The quality of adjacent roads to the parcel sold is fairly similar for each of the financial institutions. Although FmHA had a higher percentage of hardtop roads, a higher percent of dirt roads were also present. The percentage of cropland on the average tract in each category is highest for bank related sales and lowest for FCS sales. Land is sold on contract more frequently for FCS sales and notably less on FmHA and bank-related sales.

Improvements are found substantially more often on FmHA sales and the least often on bank sales. FCS tracts sold had improvements on a higher percentage of the

parcels than the bank sales. Mineral rights were conveyed least often on bank sales and most often on FmHA sales. Irrigation was present most frequently on bank sales followed by FCS and then FmHA parcels.

The region of the state where the parcel was located was not consistent between the three classifications. FCS had the lowest percentage of sales in the central region and the highest percentage in the western region. Banks had the lowest percentage in the eastern region and the highest in the central region. FmHA had the highest percent of eastern region sales and the lowest western region percentage.

The average size of the tract sold by FCS was 221 acres with a standard deviation of 240 acres. The average size of the bank sales was 198 acres and the FmHA average was 195 acres. These were essentially the same but the standard deviation was 160 acres with the bank category and 114 acres with the FmHA sales.

Several additional observations can be made. The FCS sales had a slightly lower percent of cropland which indicates more pasture and waste on these parcels. This may be explained by the evidence that FCS had slightly more sales in the western portion of Kansas where more of the land is pasture. The higher percent of sales on contract can be attributed to the fact that FCS is more accustomed to dealing with land as collateral and may be more willing to set up a note for the buyer. Banks and FmHA work more with operating notes and other short term debt and would most likely prefer to sell the land outright rather than to have the transaction structured as a loan. Banks sold land with more cropland and irrigation on it and fewer improvements. This indicates that banks have historically been more involved with cropland parcels. FmHA sales generally had lower quality land, less irrigation, and more improvements. FmHA is known as the lender of last resort and typically works with borrowers who cannot obtain credit through commercial sources. These loans are frequently used to help younger farmers get started and would consequently be used to purchase tracts which could be used as the headquarters of the operation. FmHA land sales occur more in the eastern region and less in the western region.

Pricing Model Results

The hedonic pricing model in equation 1 was estimated with OLS using 13 years of data. The parameter estimates along with the t-ratios are presented in Table 4. The adjusted R^2 for the model is 48.3%. All figures are on a per acre basis. Good quality tracts were found to bring a premium of $132.63 per acre while low quality tracts sold at a discount of $68.97 per acre compared to tracts rated as average quality. Income potential is greater on higher quality land and consequently land was expected to sell for a higher price. Low quality tracts were similarly expected to bring a discount since they have lower income producing potential as well as potentially higher variable costs if additional fertilizer and herbicide must be applied.

Sales were grouped according to the highest quality road surface adjacent to the property. The paved road premium was $72.00 per acre, and the dirt road discount was $10.34 per acre. The closer the parcel of land is to a town or city, the more likely it is that a road top surface will be blacktop. Thus, the premium may measure the effect of proximity to a town. Notice, that the dirt road is

only significant at the ten percent level, suggesting that there is not much difference both economically and statistically between whether road access is gravel or hardtop.

The premium for cropland relative to pasture was $276.88. The premium was large because of the higher earning potential of cropland relative to pasture. The presence of irrigation on a tract was found to add an average of $193.57 per acre to the sale price relative to cropland. This premium allows the buyer to purchase the higher productive potential of the irrigated parcel. In addition, it partially reimburses the seller for the investment that was made in drilling the irrigation well, leveling, installing the irrigation system, or any other related investment.

A premium of $22.77 was found for selling land on contract. When a seller finances the purchase, he may be willing to extend credit on easier terms than would be available through a financial institution under the same conditions. The buyer can justify the premium since the interest rate may be lower than would be available commercially. An average premium of $10.08 was estimated for a tract when mineral rights are included in the sale although this premium was not a substantial contribution to the sale price over the period of the study.

The results from this model estimated that the value of improvements was a $108.31 premium. The magnitude of this premium for an individual parcel depends significantly on the specific value of the improvements relative to the size of the tract sold, the cost of construction, the annual depreciation and upkeep that is anticipated, and several other factors.

The discount associated with the size of the parcel was $0.1283. This discount is multiplied by the number of acres involved in the sale to get the total per acre discount. For example, a sale of an 80 acre tract will have a discount per acre of $10.26 [($0.1283)x(80 acres)]. The discount per acre increases as the size of the parcel sold increases. A larger tract requires a more substantial outlay of cash to purchase, more machinery and equipment or livestock investment to utilize the parcel, and more management ability to operate. The number of potential buyers is limited by these prerequisites and this results in less competition among buyers and in a lower sale price.

The premium associated with a tract being located in the eastern third of Kansas was estimated to be $53.89. The discount for a tract being located in the western region was $179.39. Annual rainfall decreases as one move from the east to the west in Kansas. Thus, a premium associated with land in the east and a discount relative to land in the west is reasonable.

The estimated discount associated with the sale of a parcel by a financial institution was $33.92. An institution normally wants to sell the land quickly so that it can reinvest the money in assets with a greater cash rate of return than real estate. In addition, funds tied up in real estate are not as accessible as other assets and may cause liquidity problems for the institution.

Two other hedonic pricing models were run to further examine the robustness of this quality premium. The first alternative model was to allow each of the estimates of parameters a_1 through a_{12} in equation 1 to vary each year. This

analysis was performed to analyze whether or not the fact that nonstationary premiums and discounts for quality variables would account for the difference in seller. However, the results of the more unrestricted model suggests that the financial institution seller discount is $-39.90 per acre with a t-ratio of 5.436. Thus, the magnitude and the statistical significance are robust even when allowing premiums and discounts for quality characteristics to vary.

The second alternative hedonic pricing model which was considered took the first alternative model and allowed parameters a_1 through a_{12} to vary if the seller was a financial institution. This analysis was performed to examine whether or not quality factors were valued differently if the seller was a financial institution rather than a private seller. The results suggested that there was no difference in the quality premiums based upon the seller. The test of this hypothesis resulted in a F-value of .88 with a probability of .56. The only difference is a constant per acre discount that financial institutions receive. The results from the average model are presented because of the ease of interpretation. The results of the alternative models do not vary substantially with regard to the financial institution effect on sale price.

The discount associated with the seller being a financial institution can be explained in two ways. The first way is to view the discount as a liquidity discount. If one wants to sell land quickly, there usually is a discount associated with a quick sale. This arises from not allowing all potential buyers to do the needed research or to even become aware of a parcel of land being available for sale before it is sold. The second reason may be other psychological factors associated with a financial institution selling a tract of land. For example, other farmers in the area may be unwilling to bid on land owned by a neighbor after being repossessed by a financial institution. It is not clear whether the discount found is this study can be attributed to financial institutions wanting to make a quick sale or whether other psychological factors were associated with the sale.

Conclusions

The objective of the study was to examine whether farmland sold by financial institutions varied in its characteristics from land sold by individuals and then to examine whether these differences impacted the sale price of the parcel. A secondary objective was to examine whether seasonality existed in the Kansas farmland market. The Kansas farmland market was studied for the years 1977 through 1989. The majority of the sales by financial institutions occurred between 1985 and 1989. This study compares sales of institutions and individuals which took place during this period. The results exhibited several distinctions in characteristics between the two groups of sellers.

Financial institution sales had fewer good quality and more average quality parcels. The percentage of the parcel which was cropland was lower for institutions. Institution sales had a higher percentage of transactions which were sold on contract. More institution sales on a percentage basis had improvements present on the parcel. Financial institution sales conveyed mineral rights to the buyer on a larger percentage of the sales. Irrigation was present on a larger percentage of the institution sales. The average size of the parcel sold was essentially the same. The location of the parcel proved to be different

between the two categories of sellers. The eastern region of Kansas had a substantially higher percentage of financial institution sales and the central region had a notably lower percentage of institution sales. The western region did not produce a detectable difference.

The results of this study indicate that land sold by these institutions did not result in a different sale price based on the characteristics of the parcel than land sold by private individuals in Kansas during this study. The only discount associated with land sold by financial institutions was a $33.92 discount which applied to all land sold by institutions regardless of the specific characteristics of the parcel.

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Figure 1. Financial Institution Sales and Total Sales of Kansas Land: 1977-89

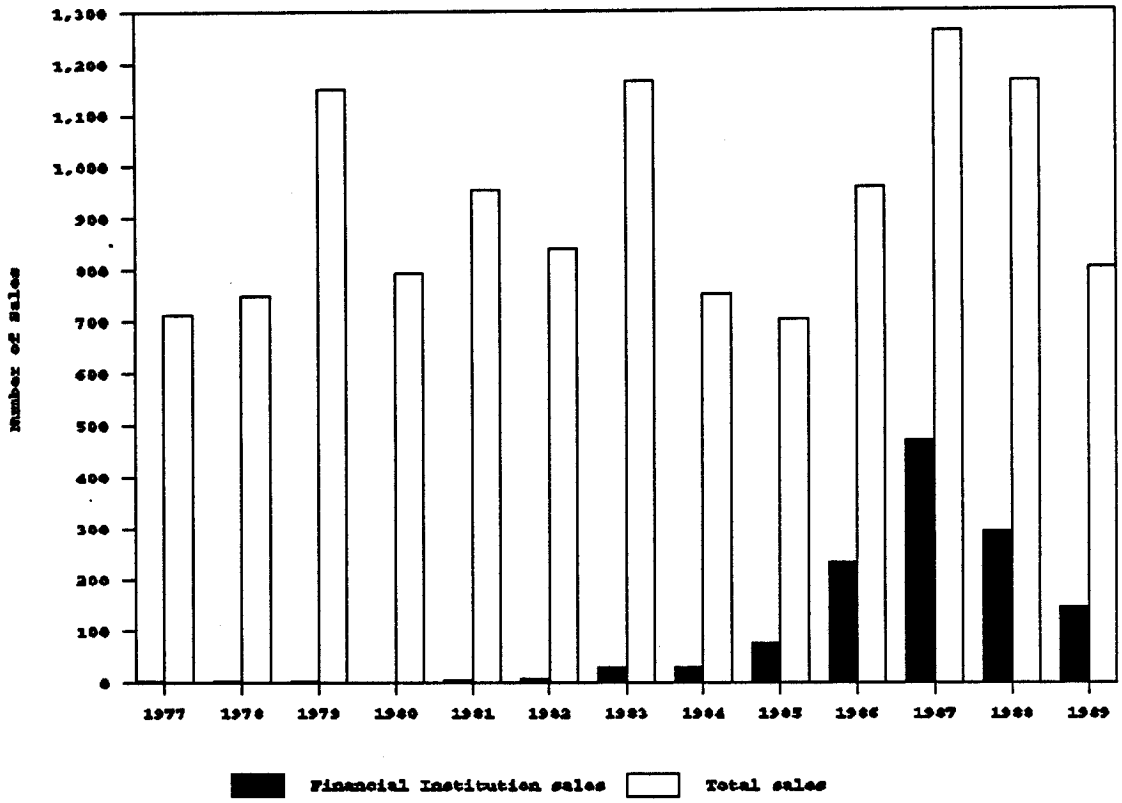

Table 1. Comparison of Sales Between Financial Institutions and Individuals in Kansas: 1985-89.

		Financial Institutions	Individuals
Quality:	Good	19.5%	29.5%
	Average	65.75	6.5
	Low	14.81	4.0
Roads:	Hardtop	13.2	14.2
	Gravel	71.37	3.0
	Dirt	15.51	12.8
Cropland		61.16	4.7
Contract		10.4	5.6
Improvements		22.11	9.8
Mineral Rights		72.56	64.0
Irrigation		10.2	6.0
Region:	Eastern	42.2	29.4
	Central	30.3	42.7
	Western	27.5	27.9

Table 2. Percentage of Farmland Sales by Institution by Year[1]

Year	Number of All Sales	FCS	Banks	FmHA	Institutions
1977	712	0.0%	013%	0.0%	0.3%
1978	749	0.0	0.4	0.0	0.4
1979	1150	0.0	0.2	0.0	0.2
1980	793	0.0	0.1	0.0	0.1
1981	956	0.1	0.4	0.0	0.5
1982	840	0.1	0.6	0.2	1.0
1983	116	0.5	1.2	0.9	2.6
1984	752	0.5	1.3	2.1	4.0
1985	701	7.7	3.1	0.1	11.0
1986	959	19.8	3.8	0.4	24.0
1987	1260	21.8	6.0	7.4	35.1
1988	1165	16.1	5.3	0.9	22.4
1989	804	7.0	5.9	4.0	16.8

[1] Numbers may not add due to rounding.

Table 3. Quality Factors by Financial Institution: 1985-1989

		FCS	Banks	FmHa
Number of Sales		762	242	141
Land Quality:	Good	20.5%	20.7%	11.3%
	Average	66.0	64.0	74.5
	Low	14.5	15.3	14.2
Road Surface:	Hardtop	11.9	12.4	19.1
	Gravel	72.9	73.6	61.8
	Dirt	15.2	14.0	19.1
Cropland %		60.3	64.0	61.7
Contract		12.6	7.9	8.5
Improvements		21.9	12.4	39.0
Mineral Rights		73.8	62.4	85.1
Irrigation		9.6	10.7	7.1
Region:	Eastern	43.2	38.4	46.8
	Central	28.3	36.4	31.9
	Western	28.5	25.2	21.3

Table 4. Premiums and Discounts for Kansas Land Quality: 1977-89

Variable	Parameter Estimate	t-Statistic
Intercept	$220.58	17.04
Good Quality	132.63	26.59
Low Quality	-68.97	10.02
Hardtop Road	72.00	12.73
Dirt Road	-10.34	1.65
Cropland	276.88	38.49
Contract	22.77	2.71
Improvements	108.31	20.76
Mineral Rights	10.08	1.56
Irrigation	193.57	21.42
Acres	-0.1283	13.20
Western Region	-179.39	32.78
Eastern Region	53.89	10.10
January	-21.78	2.21
February	12.11	1.24
March	-5.39	0.63
May	1.98	0.23
June	-9.30	0.94
July	0.75	0.07

Table 4. Premiums and Discounts for Kansas Land Quality: 1977-89 (Continued)

Variable	Parameter Estimate	t-Statistic
August	$-27.34	2.72
September	-0.78	0.08
October	-13.21	1.36
November	-5.06	0.49
December	-7.52	0.75
1988	15.93	1.48
1987	-47.51	4.46
1986	-49.00	4.38
1985	40.39	3.09
1984	104.76	8.09
1983	191.40	16.00
1982	226.17	17.82
1981	296.80	23.96
1980	292.14	24.60
1979	228.42	20.96
1978	140.14	11.03
1977	116.46	8.83
Financial Institutions	-33.92	4.46